We are of opinion that it is of fundamental importance to the progress of the natural sciences in this country that the administration of the National Natural History Collections should be separated from that of the Library and Art Collections, and *placed under one officer, who should be immediately responsible to one of the Queen's Ministers,*

We regard the exact locality of the National Museum of Natural History as a question of comparatively minor importance, provided that it be conveniently accessible and within the Metropolitan District.

GEORGE BENTHAM, F.R.S., F.L.S., F.Z.S.
WILLIAM B. CARPENTER, M.D., F.R.S., F.L.S., F.G.S.
W. S. DALLAS, F.L.S.
CHARLES DARWIN, F.R.S., F.L.S., F.Z.S.
F. DUCANE GODMAN, F.L.S., F.Z.S.
J. H. GURNEY, F.Z.S.
EDWARD HAMILTON, M.D., F.L.S., F.Z.S.
JOSEPH D. HOOKER, M.D., F.R.S., F.L.S., F.G.S.
THOMAS H. HUXLEY, F.R.S., V.P.Z.S., F.L.S., F.G.S.
JOHN KIRK, F.L.S., C.M.Z.S.
LILFORD, F.L.S., F.Z.S.
ALFRED NEWTON, M.A., F.L.S., F.Z.S.
W. KITCHEN PARKER, F.R.S., F.Z.S.
ANDREW RAMSAY, F.R.S., V.P.G.S.
ARTHUR RUSSELL, M.P., F.R.G.S., F.Z.S.
OSBERT SALVIN, M.A., F.L.S., F.Z.S.
P. L. SCLATER, F.R.S., F.L.S., F.Z.S.
G. SCLATER-BOOTH, M.P., F.Z.S.
S. JAMES A. SALTER, M.B., F.R.S., F.L.S., F.Z.S.
W. H. SIMPSON, M.A., F.Z.S.
J. EMERSON TENNENT, F.R.S., F.Z.S.
THOMAS THOMSON, M.D., F.R.S., F.L.S.
H. B. TRISTRAM, M.A., F.L.S.
WALDEN, F.Z.S., F.L.S.
ALFRED R. WALLACE, F.R.G.S., F.Z.S.

SCIENTIFIC SERIALS

THE *Archives des Sciences physiques et naturelles* (May, 1879) contain the following more important papers:—Geological review of Switzerland for the year 1878, by M. Ernest Favre (continuation).—On the lake-dwellings of the Swiss lakes, by Dr. F. A. Forel.—On the rotatory power of isocholesterine, by E. Schulze.—On the existence in a gaseous state of nitrous anhydride and nitrous acid, by G. Lunge.

The Rivista Scientifico-Industriale (No. 10, 1879) contains the following articles:—On a new instrument to study microseismic phenomena, by Prof. Giovanni Mugna.—On the regress canals for the filling of ponds, by Francesco Cagnacci (3 plates).—On the present state of Mount Vesuvius, by Prof. Semmola.—On the blue colours in manufacture of porcelain, by V. Joclet.

SOCIETIES AND ACADEMIES

LONDON

Linnean Society, June 5.—Prof. Allman, F.R.S., president, in the chair.—Attention was called to an article on Cinchona in India, by Mr. J. E. Howard. *Calisaya Ledgeriana* is shown to yield excellent results, as much as 10 per cent. of quinine, and of excellent quality, being obtained.—Prof. Parker read a memoir on the structure and development of the skull in the Urodelous amphibia. Several forms are here worked out, the Spotted Salamander serving as a type. Some of the so-called skin bones appear early, other investing bones appear later, and the investing cartilaginous roof of the nose comes after the ear capsule cartilages. Some Urodela show a stapes absent in Ceratodus and Lepidosiren. The transformations of the Anoura are carried on in the plastic larva and young to a greater extent than in the Urodela.—A paper on the Lichens collected during the English Polar Expedition of 1875-76, by Prof. Fries, of Upsala, was communicated by Sir J. D. Hooker. In Dr. Hayes's Arctic journey lichens probably were not brought away from a more northerly position than 78° N. lat., but Julius Payer, in the German Expedition, with certainty obtained specimens at Cape Fligely, 82° 5′ N. lat. With the exception of these last, but three species of lichens hitherto have been published as found beyond 81° N. lat. Thus considerable interest is attached to those got under Capt. Sir G. Nares by Capt. Feilden, of the *Alert* and Mr. Hart of the *Discovery*. As these vessels wintered in different quarters, the localities where the lichens were obtained correspondingly are more numerous, thus adding to their value as indicative of vegetable life in the frozen regions. Mr. Hart, got his at thirteen stations, Discovery Harbour, 81° 42′ N. lat., being the most northern; Capt. Feilden records twelve stations, Westward Ho Valley, 82° 41′ N. lat. being the limit. But Lieut. Aldrich gathered *Gyrophora cylindrica* on the shore of the "Palæocrystic Sea," the northernmost spot trodden by man, viz., Cape Columbia, 83° 6′ 30″ N. lat. Prof. Fries notes that the so-called "fruticolous" and "foliaceous" lichen species are feebly represented, doubtless accounted for by the severe climate, but seemingly at variance with the presence of musk oxen; added to which the reindeer moss is absent. This anomalous circumstance of the presence of large ruminants and deficiency of their usual lichen food, Capt. Feilden explains by stating that the musk ox in Grinnel Land does not feed on lichens, but on mosses and grasses. The same officer has also pointed out that the lichen growth curiously enough increased in size of species with increase of altitude. Prof. Fries concludes that, without the least credit being given to an open Polar sea (existing, no doubt, only in fancy), lichen vegetation may exist at the very Pole, if only land be there, and occasionally free from snow or ice. Among the series obtained in the Expedition, save a very few, all the forms of lichens of over 100 are already known. The abstract of a fourth contribution to the Mollusca of the *Challenger* Expedition, by the Rev. R. Boog Watson was read. This dealt with the Trochidæ and Turbinidæ.—The Secretary also read a communication on a remarkable new form of Helvella, this fungus being described by Mr. W. Phillips.—Mr. C. B. Clarke summarised a lengthened memoir by him, viz., a "A Review of the Ferns of North India." He showed that many of the localities given by Dr. Wallich, and doubtfully received by botanists were doubtless correct.—Mr. A. D. Michael was elected a Fellow of the Society.

Zoological Society, June 17.—Prof. W. H. Flower, F.R.S., president, in the chair.—Mr. Sclater exhibited a skin of *Ara glauca*, from Mr. Boucard's collection, obtained at Corrientes, and stated that having compared it with the *Ara* now in the Gardens, purchased in June, 1860, and hitherto named *A. glauca*, he had come to the conclusion that the living bird belonged to the allied form *Ara leari*.—Prof. Flower called attention to the skull of the female sea-lion, which had lately died at the Southport Aquarium, and pointed out that it belonged to *Otaria gillespii*, and not, as had been supposed, to *Otaria stelleri*.—Mr. C. G. Danford exhibited and made remarks on some remarkable antlers of deer, which he had obtained during his recent journey in Asia Minor.—Prof. Newton exhibited skins of some rare species of birds obtained by Mr. Edward Newton, C.M.Z.S., in Jamaica.—Mr. F. D. Godman exhibited and made remarks on a drawing of the manatee by Mr. Wolf, taken from the specimen lately living in the Westminster Aquarium.—Hans, Graf von Berlepsch, exhibited and made remarks on the skins of two varieties of the long-tailed titmouse (*Mecistura caudata*), which occurred near Cassel, in Germany, one of which appeared to be the same as the British form of this bird.—Dr. J. Murie read a paper on the manatee, containing the results of his examination of the specimen which was lately living in the Westminster Aquarium. The peculiar attitudes assumed by the animal in life, the great mobility of the upper lip, and the occasional use of the limbs in feeding were noted. As regards the anatomy, the chief points dwelt on were the shape of the brain and its suppressed convolutions. The vexed question of the number of the cervical nerves and their distribution was also discussed.—A communication was read from Mr. A. H. Garrod, on the brain and on other points in the structure of the adult male hippopotamus, which was presented to the Society by the late Viceroy of Egypt, in 1850, and which died in the Society's gardens in March, 1878.—A second communication from Mr. Garrod contained a note on the mechanism of respiration, as well as of the retraction of the head and limbs in certain chelonia.—Dr. Gwyn Jeffreys communicated the second part of his work on the mollusca of the *Lightning* and *Porcupine* Expeditions, embracing the families from *Anomiidæ* to *Arcidæ*. The number of species noticed was 100, of which 4 were new to science, and 15 were hitherto unfigured. Particulars were given of the geographical and geological distribution of all the species, and their synonymy was discussed. Some species of *Leda* and *Malletia* were Sicilian fossils of the pliocene formation, and had not been previously known as recent or living. These species

occurred at great depths, a fact which showed that the sea-bed in that part of the Mediterranean had been considerably raised since the tertiary epoch.—Mr. Edward R. Alston read a note on the *Acanthomys leucopus* of Gray, showing that it does not belong to the genus *Acanthomys* but to *Mus* proper. As the name *leucopus* is pre-occupied in the latter genus, he proposed to call the species *Mus terræ reginæ*.—Mr. W. L. Distant read a paper on the African species of Lepidoptera of the genus *Papilio*. A new species from Magilia, East Africa, was described, and the name of *Papilio hornimani* was proposed for it. —A communication was read from the Count T. Salvadori, C.M.Z.S., containing further particulars of the new Pheasant from Western Sumatra which he had recently described as *Acomus inornatus*.—Messrs. Godman and Salvin gave an account of some hitherto unrecorded diurnal lepidoptera, obtained by the Rev. George Brown in Duke of York Island and New Ireland, together with descriptions of some apparently new species.—A communication was read from Mr. F. Jeffrey Bell, being the second of the series of his observations on the characters of *Echinoidea*. The present paper contained an account of the species of the genus *Tripneustes*.—Messrs. Sclater and Salvin read a paper on the birds of Bolivia, based principally upon an examination of the specimens obtained by Mr. Buckley during two expeditions into that country.

Geological Society, June 11.—Prof. Joseph Prestwich, F.R.S., vice-president, in the chair.—Noel W. Rudstone Read, was elected a Fellow; and M. Edouard Dupont, of Brussels, Dr. Franz von Kobell, of Munich, and Dr. Emile Sauvage, of Paris, Foreign Correspondents of the Society.—The following communications were read:—On a mammaliferous deposit at Barrington, near Cambridge, by Rev. O. Fisher, F.G.S. The gravel in which these remains were found is about 20 feet above the alluvial flat by the River Rhee, and is evidently post-glacial. The gravel contains some of the ordinary land and fresh-water shells, but not *Cyrena* or *Unio*. Remains of the following mammalia have been found:—*Ursus spelæus*, *Meles taxus*, *Hyæna spelæa*, *Felis spelæa*, *Cervus megaceros*, *elephus*, and another, *Bos primigenius*, *Bison priscus*, *Hippopotamus major*, *Rhinoceros leptorhinus*, *Elephas antiquus* and *primigenius*, with a worked flint, almost certainly from the same deposit. The author considers the abundance and admixture of these remains due to the locality having been a sort of eddy or pool in the old river. The remains are described, and the rest of the paper is occupied with a correlation of the gravel with others in the adjoining district, and a consideration of the physical conditions under which it was deposited.—Further discoveries in the Cresswell Caves, by Prof. Boyd Dawkins, F.R.S., and the Rev. J. M. Mello, F.G.S., with notes on the mammalia by the former. This paper contained the account of digging-operations carried on in one of the smaller caves of the Cresswell Crags, known as Mother Grundy's Parlour. The authors described the occurrence in the red clay and ferruginous sand of this cave of bones of hippopotamus and the leptorhine rhinoceros, proving the existence of these animals in the wooded valleys of the basin of the Upper Trent at the time of the accumulation of those deposits; while at the same time, so far as the evidence goes, there was an absence of palæolithic man, of the reindeer, and of horses, while hyænas were abundant. In a subsequent period, represented in all the caves by the red sand, the mammoth, woolly rhinoceros, horse, and reindeer inhabited the vicinity, and were subject to the attacks both of hyænas and of human hunters, whose quartzite implements prove them to belong to the same people whose traces are found in the river-deposits. In the breccia and upper cave-earth of the larger caves the existence of the palæolithic hunter is evidenced by flint implements, resembling those of Solutré, accompanied by implements of bone and antler. Associated with these was the incised figure of a horse described in a former paper. The authors finally dwelt briefly upon the characteristics of the caves in prehistoric and historic times, and indicated some of the anthropological points of interest connected therewith.—On the pre-Cambrian rocks of Shropshire, part 1, by C. Callaway, F.G.S.—On the occurrence of a remarkable, and apparently new mineral in the rocks of Inverness-shire, by William Jolly, F.R.S.E., H.M. Inspector of Schools, and J. Macdonald-Cameron, Fel. Inst. Chem., F.C.S. In this paper the authors refer to a blue mineral of a somewhat remarkable character, noticed at Englishton Moor and neighbourhood, distant westwards, from Inverness, about 5 miles, where the mineral occurs in scattered blocks. It has since been noticed at Moniack Burn, Reelig Glen, and South Clunes Farm, all in the same direction, but distant from Inverness about 10 miles; also near Dochfour House, at the north end of Loch Ness, close by Dochgarroch Lock of the Caledonian Canal. In colour and general appearance this mineral resembles crocidolite, but analyses point to its being more nearly related to ægirite, a member of the amphibole group, which has the general formula $Si_3(\frac{1}{2}\ddot{R} + R^3)$. The mean of several analyses shows it to have the composition $6SiO_2$, Fe_2O_3, $2MgO$.

Physical Society, June 14.—Prof. W. G. Adams in the chair.—New Members: Donald Macalister, B.A., and Mr. St. George Lane Fox.—Prof. Macleod described a plan for suppressing the induction disturbances in a telephone circuit. It is known that a secondary battery composed of metal plates and sulphuric acid allows weak currents to pass while stopping those of high tension. Prof. Macleod inserted a secondary battery of platinum plate between the line and the telephone, but this stopped both the induction and the vocal currents. When platinum wires were substituted for the plates, however, the induction-currents were stopped, while the vocal currents could be feebly heard.—Dr. O. J. Lodge exhibited his new reversing key for electrometer work, which is preferred to the ordinary forms as giving a high insulation, small capacity, and not requiring the hand to approach close to it to work it. It consists of four platinum wires arranged in pairs crossing one another, one pair crossing between the other two. These are the terminals and contact pieces of the key. The middle pair are supported by an endless silk thread which runs on two pulleys, one of which is fitted with a handle. On turning the handle to right or left the two middle wires are brought into contact with one or other of the two outer wires, and the current reversed at will. The whole is inclosed in a metal box.—Mr. J. F. Moulton then demonstrated the results of the experiments of Mr. Spottiswoode and himself on the sensitiveness of electric discharges in vacuum tubes. These experiments were undertaken to find the cause of the luminous layers or strata in the discharge, a Holtz machine being employed. It was observed that when feeble currents were drawn from the machine, the discharge could be depressed by laying the finger on the tube, and this depression always occurs with intermittent currents, therefore the feeble currents form a continuous current Holtz discharge themselves, like intermittent currents, by reason of their feebleness. This sensitiveness of the discharge to the approach of the finger was found to be due to the conductivity and electric capacity of the hand. Electricity opposite in kind to the discharge is induced on the finger, and streaming upon the tube, neutralises part of the discharge therein. This effect was also shown by means of tinfoil rings round the tube. An intermittent current is of course capable of this static induction on neighbouring conductors. The luminous discharge in a vacuum-tube consists of a bright sharp glow at the negative terminal, followed by a dark space, then a hazy bluish light at the positive pole. The striæ or layers in these sensitive tubes merely repeat this appearance. They can be artificially produced by placing the fingers, or rings of metal, at intervals along a tube conveying an amorphous discharge; for in this case the induced electricity discharging itself from the fingers, breaks up the amorphous discharge into dark and bright layers. In these stratified discharges the electricity appears to travel *per saltum*, or by stepping-stones, as one may say, and the glow seems to be a molecular structure, a view which is supported by Mr. Crookes's experiments. A negative discharge from the finger produces a dark space in the tube discharge, and a positive one a bright line; therefore one can tell the kind of discharge passing in a tube by laying a finger on it. If the same pole be brought to both ends of a tube a discharge will still take place from each end, and there will be a dark space in the middle, the electricity here seeming to turn back again the way it came. The discharge from a pole through a vacuum tube would therefore appear to be not akin to conduction, but to a disruptive discharge. It is a leap in the dark, and the phenomena observed are due to the gaseous nature of the medium. These experiments point to the possibility of completing a circuit by positive electricity alone. Prof. Guthrie suggested that by combining vacuum-tubes with the conduction-balance of Prof. Hughes it might be possible to get an optical balance for measuring inductive capacity.—Dr. Henry Draper, of New York, who is now on a visit to England, then addressed the meeting on his alleged

discovery of oxygen in the sun by bright lines in the solar spectrum. He said that hitherto he had not been able to find these lines projecting from the limb of the sun, like hydrogen, and his impression is that oxygen resides lower than the reversing layer. He had lately been extending the dispersion of the spectrum of terrestrial oxygen, and from a light of maximum intensity of one-candle power had now got a dispersion of eighty inches from A to O. He exhibited two of the original negatives of the solar spectrum showing the bright lines. Mr. J. Norman Lockyer congratulated solar science on having so able a worker as Dr. Draper, and remarked that if Dr. Draper proved his case for even two or three O lines it would be sufficient, considering the variability of the spectrum of matter under different physical conditions. He also alluded to the traces of carbon which he himself had found in the sun by the dark flutings in the spectrum. Dr. Draper said he did not see why carbon should not give both bright and dark lines.—Mr. Scott exhibited a number of coloured photographs done after the method of M. Albert, of Munich.

Statistical Society, June 17.—Dr. William A. Guy, F.R.S., read a paper on tabular analysis. Dr. Guy began his paper by stating that its chief object was to call attention to a particular form of tabular analysis first proposed by Dr. Tweedy John Todd, of Brighton. Dr. Guy in the course of his paper mentioned briefly the inquiries to which he had applied Dr. Todd's method as modified by himself. He had made use of it in the inquiry entrusted to him in 1862 into the effects of the poison known as emerald-green when used in the arts; in comparing the statements made in the four gospels; in contrasting the evidence of different witnesses in the Tichborne case; in inquiries relating to poisoning by arsenic and strychnine; and in comparing poisoning by strychnine with tetanus. The general use of tabular forms for purposes of illustration was largely illustrated by various specimens which Dr. Guy had used in his lectures at King's College, and former papers read before the Society. They had reference to crime, to fluctuation in recurrent events, &c., &c. The author finished his paper by stating that he believed he did not attach undue importance to tabular analysis, or the discovery of truth by means of tabular forms, as distinct from tables of record and tables of illustration, when he anticipated from their intelligent and more extended use, not only greater accuracy of statement and completeness of description, but important discoveries also. The Statistical Society was dealing with a vast array of facts, into which scientific methods and scientific treatment are ever introducing more and more of order, more and more of light.

PARIS

Academy of Sciences, June 16.—M. Daubrée in the chair.—The following papers were read:—Transmission of the hour at Paris Observatory to commercial ports for regulation of chronometers, by M. Mouchez. He is hoping to accomplish this once a week, at least, by telegraph; but the expense is at present a difficulty.—On the development of the perturbative function where, the eccentricities being small, the mutual inclination of the orbits is considerable, by M. Tisserand.—On the spherical regulating spiral of chronometers, by M. Phillips.—Observations on M. Lamarsky's note on Stokes's law, by M. E. Becquerel. The phenomena of fluorescence do not depend on a simple change of refrangibility of luminous rays falling on a body (as M. Lamarsky seemed to say), but on a complete transformation of the vibratory movement. The illuminated body gives out, by an action proper to it, light whose composition cannot be connected in a simple way with the nature of the incident vibrations.—On the density of vapour of bisulphydrate of ammonia, by M. Sainte-Claire Deville. He gives details of this from old laboratory notes (having been reminded of the omission by MM. Engel and Moitessier).—Determination of the height of mercury in the barometer at the equator; amplitude of diurnal barometric oscillations at different stations in the Cordilleras (continued), by M. Boussingault. His observations at Bogota did not confirm Mutis's assertion of a lunar influence on the barometric heights, though a very delicate instrument was used. He found the average monthly heights greatest in June and July, least in December and January (when the earth is nearest the sun). He gives meteorological details regarding Antisana Farm, which is at an altitude of 4,100 metres.—On the last modifications made in the sluice of Aubois, and on the means used in it to deaden the percussions of the movable tubes on their seats, by preventing their rebound, by M. De Caligny.—M. Daubrée presented the first part of a work entitled "Synthetical Studies of Experimental Geology," being a collection of papers published during the last thirty years.—Observations of the planet 198, discovered at Marseilles Observatory, by M. Borrelly.—On the surface of the wave and the transformation of a pencil, by M. Mannheim.—On the employment of elliptic functions in the theory of the plane quadrilateral, by M. Darboux.—Theorems of indeterminate analysis, by M. Pepin.—Experiments on the resistance opposed by the air to movement of a surface, by M. Saint-Loup. A plate, inclined to the direction of motion, and fixed at the head of a horizontal radial bar, was driven round a vertical axis, a special arrangement being added to measure the resistance. The resistance for a plane surface of 1 square decimetre making angle ϕ with its path is expressed by the formula—

$$P_\phi = 0{\cdot}1768\ (4^{\sin\phi} - 1)\ V(11 + 1{\cdot}061\ V).$$

—On the electric dilatation of the armatures of Leyden jars, by M. Duter. He finds the law verified, which is expressed by the equation $u = \frac{KV^2}{e}$, where u is the increase of volume of the jar, e its thickness, V the difference of potential of its armatures, and K a coefficient characteristic of the apparatus. He considers that electric pressure is not the cause of the phenomenon, but that there is here a new phenomenon of electricity.—On the same subject, by M. Righi. He distinguishes *instantaneous* dilatation, due chiefly to polarisation of the glass, from *persistent* dilatation, not before observed, and due to development of heat; and he thinks it probable that at the same time the polarisation and perhaps also the attraction between the armatures produce in the glass a diminution of thickness.—On the suspension of clouds and their elevation in the atmosphere, by M. Oltramare. He offers a solution based on the idea that each molecule of a cloud is charged with electricity.—On the basic sulphydrates of ammonia, by M. Troost.—On a new natural sulphate of manganese (mallardite), and a new variety of sulphate of iron (luckite), by M. Carnot. These are from the gold and silver mines of Utah.—On the structure of cells of the kidney in the normal state, by M. Cornil. He finds them composed of two substances, the one peripheric and solidified by osmic acid, the other central, containing granulations and the nucleus of the cell.—Action of electric currents on the muscles of the claw of the crayfish, by M. Richet. Excited directly by strong induced currents, the muscle shows a very prolonged contraction, the duration of which is proportional to the intensity of the stimulus.—On the systematic position of Volvocineæ, and on the limits of the vegetable and animal kingdom, by M. Maupas. He agrees with Cohn and others in classing Volvocineæ among the algæ, with Palmellaceæ, &c.—Influence of media on the structure of roots, by M. Mez.—On a migration of butterflies of the species *Vanessa cardui*, observed at Angers on June 10 last, by M. Decharme.—On some modifications in the apparent colours of flowers by the electric light, by M. Hugo. Such changes were noticed in *Nedularium* and *Caladium*.

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